J.biosoc.Sci, (2008) **40**, 35–52, © 2007 Cambridge University Press
doi:10.1017/S0021932007002295 First published online 4 Sept 2007

URBAN–RURAL CONTRASTS IN EXPLANATORY MODELS AND TREATMENT-SEEKING BEHAVIOURS FOR STROKE IN TANZANIA

G. MSHANA*, K. HAMPSHIRE†, C. PANTER-BRICK†, R. WALKER‡ AND THE TANZANIAN STROKE INCIDENCE PROJECT TEAM

**National Institute for Medical Research, Mwanza, Tanzania, †Department of Anthropology, Durham University, UK and ‡North Tyneside General Hospital, North Shields, UK*

Summary. Stroke is an emerging problem in sub-Saharan Africa, about which little is known since most research to date has been based on retrospective, hospital-based studies. This anthropological work, designed to complement a large community-based project on stroke incidence, focuses on local understandings and treatment-seeking behaviours in urban (Dar-es-Salaam) and rural (Hai) areas of Tanzania. Semi-structured interviews (n=80) were conducted with 20 stroke patients, 20 relatives of stroke patients, ten traditional healers, and 30 other local residents. In contrast to common expectations, and literature that finds witchcraft beliefs to be most common in rural areas, stroke in urban Dar was widely believed to emanate from supernatural causes (demons and witchcraft), while in rural Hai, explanations drew mostly on 'natural' causes (hypertension, fatty foods, stress). These different beliefs and explanatory models fed into treatment-seeking behaviours. The first option in Hai was hospital treatment, while in Dar-es-Salaam, where belief in demons led to hospital avoidance, it was traditional healers. In both sites, multiple treatment options (serially or simultaneously) were the norm. Analysis of patient and carer narratives suggested that causation beliefs outweighed other factors, such as cost and distance, in shaping effective treatment. Three policy implications are drawn. First, as other studies have also shown, it is important to engage with, rather than dismiss, local explanations and interpretations of stroke. Stroke awareness messages need to take into account the geographical and belief systems differences. Developing an understanding of explanatory models that recognizes that local beliefs arise from dynamic processes of social interaction will be critical to designing effective interventions. Second, there is a clear role for multiple healing systems with possibility of cross-reference in the case of a chronic, disabling condition like stroke, since biomedical treatment cannot offer a 'quick fix' while traditional healers can help people come to terms with their

condition. Third, issues of communication between health services and their patients are particularly critical.

Introduction and theoretical framework

Cerebrovascular disease is the second leading cause of death worldwide (Murray & Lopez, 1997), with stroke accounting for 9·6% of deaths globally (WHO, 2002). Stroke is currently the dominant type of cardiovascular disease in China, South-east Asia and sub-Saharan Africa (SSA). While cardiovascular diseases are not generally considered a major public health problem in developing countries (Reedy, 2004), available evidence suggests that stroke is an emerging problem in SSA (Walker *et al.*, 2000; SASPI Project Team, 2004a, b; Connor *et al.*, 2007). To date, however, no population-based stroke incidence studies have been published and little is known of mortality and morbidity outcomes of stroke in SSA (Walker *et al.*, 2000; Connor *et al.*, 2007). The majority of existing stroke studies are subject to a number of limitations: most are retrospective and based on hospital records, often, for example, simply reporting in-hospital mortality (Connor *et al.*, 2007).

Local beliefs and understandings surrounding stroke in SSA are poorly understood. A thorough literature search yielded only two published studies on this subject in SSA. Hundt *et al.* (2004) investigated lay conceptualizations of stroke-like symptoms and impact on health-seeking behaviour, as part of a prevalence study in a rural population (~60,000) of South Africa. They reported that stroke-like symptoms were considered both a physical and a social condition. Plural healing using clinical and social means (visiting doctors, healers, prophets and churches) was common. As this was a cross-sectional study, information on treatment seeking at the time of stroke affliction relied on recall from some years previously, and the sample might under-represent those with severe strokes who did not survive in the longer term. Bham & Ross (2005) appraised cultural beliefs and practices of South African Indian Muslims, concluding that faith and religion featured strongly with regards to stroke aetiology; both traditional and Western medicine were used for treating stroke, though Western health care treatment was regarded as culturally inappropriate. They interviewed both care-givers and traditional healers, but not stroke patients themselves.

Medical pluralism based on multiple illness theories and religious ideologies is a common feature of treatment seeking in SSA. For example Beckerleg (1994) found that the Swahili of Coastal Kenya employ several treatment options such as hospital, self- and healer-administered traditional medicine and religious-based healing. Medical pluralism results from beliefs that illness is a product of both natural and supernatural causes, and a desperate search for a cure. For example, among the Luo in Kenya, malaria and dysentery are held to arise from natural or environmental causes, and may be treated using modern medical treatment, while other illnesses are believed to emanate from witchcraft or from breaching particular taboos and are thereby not amenable to treatment from Western medicine (Sindiga, 1995). Similar findings have been reported for a large number of other African populations (Nyamwaya, 1981; Ingstad, 1990; Beckerleg, 1994; Castle, 1994; Mabilia, 2000; Kusimba *et al.*, 2003; Mshana *et al.*, 2006). The attribution of illness to both natural

and supernatural causes has led to differing opinions as to whether African illness aetiologies and treatments are primarily characterized by 'supernatural' explanations, e.g. witchcraft and spirits, or 'natural' explanations, such as theories of contagion (Green, 1999).

Research on access to health care in SSA often uses an economic framework, examining the accessibility of health services by local people, the great majority of whom are very poor. In Tanzania, structural adjustment programmes (SAPs) introduced in the mid-80s saw the introduction of user fees in public health services. This led to a widespread concern that health services would be inaccessible to people who could not afford to pay (Narayan, 1997). In Tanzania, studies report that access to health care is also strongly influenced by cultural knowledge and interpretation of disease symptoms (Comoro *et al*., 2003; Kamat, 2006), structural and gender constraints (Green, 2000; Kamat, 2006) and trust in providers (Tibandebage & Mackintosh, 2005).

The present study explores beliefs regarding the causes of stroke and their impact on treatment-seeking behaviours in rural and urban settings within Tanzania. Its theoretical framework focuses on explanatory models whereby causation beliefs are held to influence how people make sense of, and respond to, an illness. Explanatory models are sets of beliefs that 'contain any or all aspects of five issues: aetiology; onset of symptoms; pathophysiology; course of sickness (severity and type of sick role); and treatment' (Kleinman, 1980). Held by individuals, they simultaneously create order and meaning, help purposive action, and produce the conditions required for their own perpetuation or revision (Kleinman, 1980). Explanatory models are diverse even within the same community and are likely to alter over time in response to particular medical experiences (Kleinman, 1980, pp. 106–111). Therefore, an illness or disease experience may be interpreted within a range of cultural or religious frameworks leading to different courses of remedy seeking for individuals or communities. For example, in predominantly Islamic communities, reproductive health is largely framed within a range of understandings of Islamic dictates; understandings which vary from community to community (Inhorn & Sargent, 2006). A wide range of studies and analyses on illnesses such as diabetes (Poss & Jezewski, 2002), AIDS (Baer *et al.*, 2004) and cancer (Dein, 2004) have been framed within the explanatory models framework.

Drawing on anthropological theory and methods, this present study appraises how individuals draw upon a range of resources (culture, religion, education, extended family, social networks, exposure to public health messages, and perceived treatment efficacy) when attempting to make sense of stroke, its causation and burden. The research was designed to complement an epidemiological study: the Tanzania Stroke Incidence Project (TSIP) – a three-year prospective study assessing stroke incidence, risk factors and outcomes in the Dar-es-Salaam and Hai study populations of the Adult Morbidity and Mortality Project (AMMP) (Walker *et al.*, 2000). Case detection proceeds when one of the local TSIP enumerators reports that someone is suspected of having suffered a stroke. A field supervisor then arranges for transport and admission to hospital, while the research physician coordinates investigations (electrocardiogram (ECG), computerised tomography (CT) head scan, blood tests) and follow-up after discharge. The project meets the costs of transport, hospital stay, tests

and treatment, along with one year of secondary prevention treatment of stroke such as hypertension treatment. Despite these incentives to minimize both an 'economic barrier' and a 'distance barrier', people in Dar-es-Salaam were reluctant participants in this project. Feedback from a workshop conducted with TSIP stakeholders (community members, traditional healers, health workers, project staff) suggested that stroke patients in Dar-es-Salaam were reluctant to be admitted to hospital, due to a widespread belief that stroke is caused by witchcraft. The anthropological study was commissioned to further explore these issues.

Study sites

Fieldwork for this anthropological study was conducted for one month at each site (Dar, September 2004; Hai, March 2005).

Dar-es-Salaam is the commercial capital of Tanzania, located on the Indian Ocean coast. Main economic activities are commerce, including all forms of trading, both large- and small-scale, formal employment in the government or private sectors, and fishing. In Ilala and Temeke districts where this study was conducted, the population is of mixed ethnicity, originating from other parts of Tanzania despite being originally occupied by the Zaramo ethnic group. Seventy per cent of residents in the Dar-es-Salaam AMMP project area are Muslims while Christians make up the remaining 30% (Indepth Network, 2002).

Hai district is located in Kilimanjaro region, north-east Tanzania. It spans the slopes of Mount Kilimanjaro and the dry plains on the leeward side of the mountain. Its main highway goes from Arusha town (tourist centre and headquarters of the East African Community) to Moshi town and Dar-es-Salaam. The main ethnic group is Chagga, though there are also small pockets of Pare and Maasai. In the Hai AMMP site, the majority are Christians (79%) while the remaining 21% are Muslims (Indepth Network, 2002). The main economic activities are small-scale and subsistence farming (bananas, maize, beans, coffee) and medium-scale flower farming for export. Cattle-keeping is also common, especially among the Maasai. Though considered rural, Hai has a well developed education and medical infrastructure relative to other rural areas: the district has many primary and secondary schools and hospitals (e.g. Machame hospital, a large private institution established by the Lutheran church over 100 years ago). There are also many retired teachers, civil servants and company employees who returned to their villages at the end of their paid working lives.

While the inclusion of these two sites might provide an opportunity to examine rural/urban differences related to stroke perception and treatment, there are clearly confounding factors operating: social, historical and cultural differences. In particular, the religious beliefs and practices framing experiences of health, illness and well-being mean that a straightforward rural/urban comparison is not possible.

Methods

The qualitative research design relied primarily on in-depth interviews using a semi-structured guide on topics such as respondents' educational background, beliefs

about causes of ill health in general and stroke in particular, and stroke-related treatment-seeking behaviours. Semi-structured interviews allow maximum flexibility of coverage and capture the richness of the themes articulated by respondents (Drever, 1995).

A combination of sampling methods was used, both purposive and random, to capture variation in respondents' characteristics along the following dimensions: study site (40 from Dar, 40 from Hai); gender (40 men and 40 women); and experience of stroke (20 patients, 20 relatives, 10 traditional healers, 30 other local residents). The *patients* were identified from data gathered by TSIP physicians and field enumerators – they were selected after consideration of their physical state, since stroke-related speech impairment and brain damage could make a meaningful interview difficult. *Relatives* were selected from patients' households, having asked who had been closely involved in managing the illness and made observations confirming such reports. *Healers* were randomly selected from a list of 30 traditional healers provided by the TSIP community enumerators. *Other lay people*, who were not part of TSIP, were randomly selected from village or *mtaa* registration lists (*mtaa* is the Swahili word for street).

The sampling procedure is subject to certain limitations. Stroke patients were recruited from a pool of individuals about whom TSIP staff had become aware through the reporting network. As a result, those who sought only traditional treatments, or no treatment, for stroke were more likely to have been missed than those seeking treatment at hospital (all health facilities to which stroke patients might be admitted are checked on a regular basis). The risk of under-estimation is relatively small, however, since TSIP enumerators are local people, based in villages, likely to pick up most cases of people with stroke-like symptoms, even if they have not sought formal treatment.

Interviews were conducted at suitable locations, mostly at the respondents' home, for the convenience of participants and to ensure confidentiality. They were preceded by rapport building through general conversation (for example, about weather and sports) and conducted in Swahili by same-sex interviewers, taking between $1\frac{1}{2}$ and 2 hours and tape-recorded. Ethical approval was obtained from the Tanzanian Medical Research Coordination Committee and informed consent (signed or thumb printed) was obtained from all respondents before commencing interviews.

Multistage data analysis was employed. Data transcripts (of Swahili interviews into English) were reviewed and summarized in chart form. Emerging themes were then identified, using the principle of grounded theory whereby theoretical understanding emanates from data (Glasser & Strauss, 1967). Data were examined again in light of hypotheses emerging in this first stage of analysis. Validation was sought by shifting between emic and etic perspectives (Miles & Huberman, 1994); where cases were discrepant with ongoing hypotheses, they served to re-appraise explanatory models (Bernard, 1995).

Results

This section begins by presenting socio-demographic characteristics of the respondents, a typology of healers interviewed and an overview of local terms used for stroke,

before discussing in-depth findings on causal explanations of stroke in the two field sites and how these relate to treatment-seeking behaviour and decision-making (see Fig. 1).

Socio-demographic characteristics (see Table 1)

The majority of respondents (70%) had just primary school education. Smaller numbers had secondary school education (20%) or no formal schooling at all (10%). Excluding the traditional healers, the majority of respondents (80%) were housewives, casual labourers, farmers, retirees or self-employed in small businesses such as selling food and hair salons. The remaining 20% were employees (such as teachers and soldiers) and students.

Typology of healers

The term 'traditional healer' is used here to refer to the four categories of healers interviewed. One healer self-identified as a herbalist and reported only using treatments made from plant roots and leaves. Two healers said they treated through possession of spirits known as *maruhani*. When a patient goes to them, they invoke the spirits and are then able to ascertain the cause and appropriate mode of treatment. They said it is the *maruhani* who treat people through them because if not possessed, they are not able to treat. A 54-year-old female healer in Dar said:

> They [*maruhani*] come in my head … the *maruhani* come into my head, they treat in their way … they tell you … make you dream that this ill person will be treated using so and so medicine, [the *maruhani* tell you] go to the shop and ask for so and so medicine … the shops selling Arabic medicine.

A third group of five healers use a form of divination known in Swahili as *kupiga bao* or *ramli* to tell the cause of an illness and thereafter treat their patients using medicine from plant and animal products. The fourth group, consisting of two healers, treat their patients using verses from the Koran in combination with plant and animal products. Respondents referred to traditional healers as *mganga* [sing.] *waganga* [pl.] (healers or doctors), *mganga/waganga wa kienyeji* (local healers/doctors) and *fundi* or *mtaalam* (expert). Respondents did not make a clear distinction between the different types of healers.

Terms used for stroke

The Swahili word for stroke – *kiharusi* – is generally recognized by the lay population. This specific noun has no other meaning in Swahili. It was the main term for stroke in Dar-es-Salaam, though in Hai, stroke is more commonly referred to as *paralaizi* (paralysis) or *presha* (pressure), due to people associating stroke with partial body paralysis and hypertension. Partly due to TSIP, patients and relatives were familiar with stroke as a condition and could talk of specific symptoms and outcomes such as sudden loss of conscious, body weakness and partial paralysis. The experience of going to hospital through TSIP and interaction with doctors and other health workers may have contributed to raising stroke awareness among patients and their

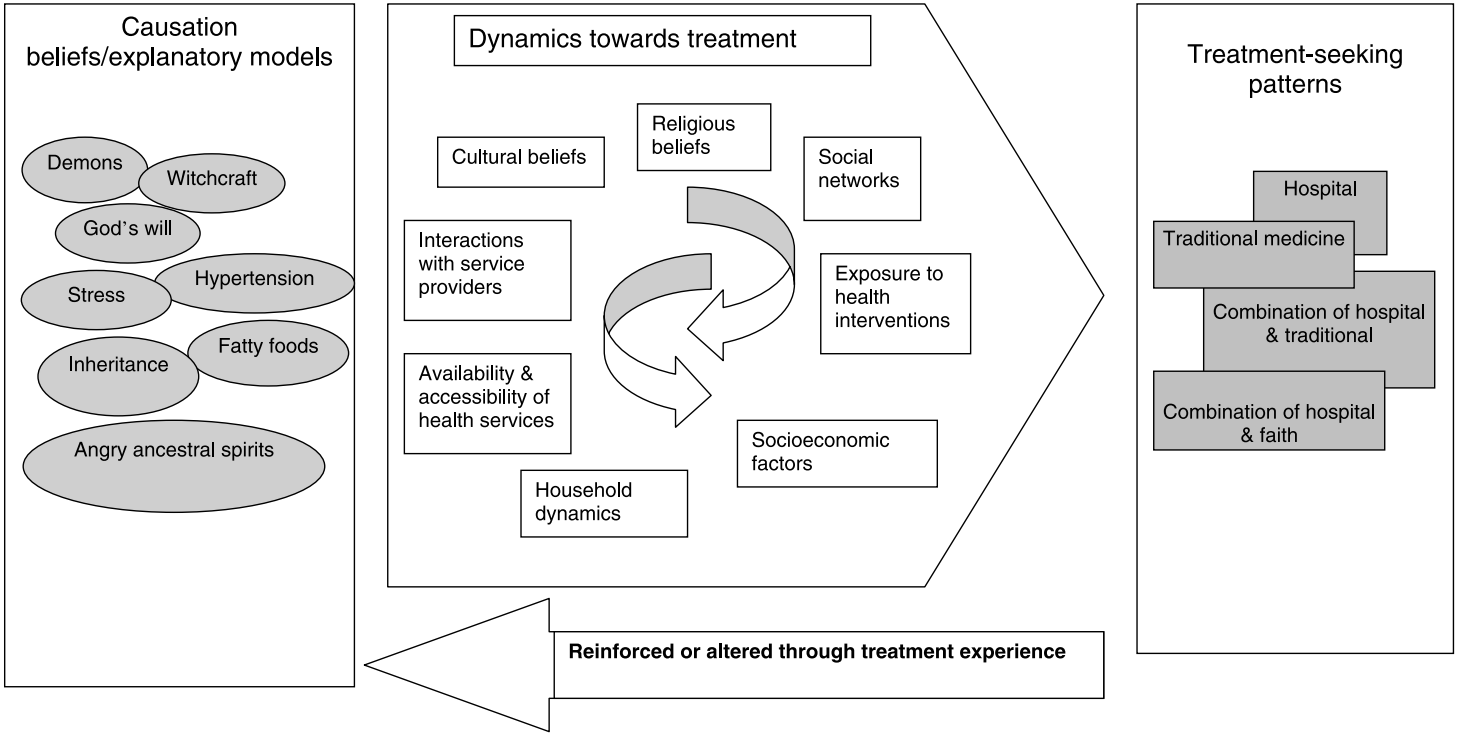

Fig. 1. Causes and treatment-seeking options for stroke reported in urban Dar and rural Hai.

Table 1. Socio-demographic characteristics of respondents ($n=80$)

Category of respondent	Number of respondents		How selected	Sex		Age range	Religion	
	Hai	Dar		Male	Female		Christian	Muslim
Patients	10	10	Purposively from TSIP[a] recruits	10	10	32–80	11	9
Relatives/carers[b]	10	10	Purposively from patient homes	6	14	17–68	11	9
Traditional healers	5	5	Randomly from list of healers in area prepared by TSIP enumerator	7	3	40–70	1	9
Others	15	15	Randomly from village/*mtaa*[c] registration list	17	13	22–63	16	14

[a]Tanzania Stroke Incidence Project.
[b]These comprised eight wives of patients, three husbands of patients, three sisters, one daughter, one daughter-in-law, one brother, one fellow tenant and two neighbours.
[c]*Mtaa* is the Swahili word for street.

carers. Other respondents talked about stroke in general terms since most had not seen a patient. Terminology and the condition talked about were clarified at the beginning to avoid misunderstandings during interviews.

Perceived causes of stroke

(a) *Demons.* In Dar-es-Salaam, stroke was widely understood to be caused by 'demons', in complete contrast to rural Hai (demons were mentioned by 26 Dar and four Hai respondents).

Respondents in Dar-es-salaam used Swahili terms such as *upepo mbaya* (literarily meaning bad wind), *mdudu* (insect) and *mnyama* (animal) when referring to the demons causing stroke. A 65-year-old man explained:

> Stroke cause is similar to convulsions … we say it is *mdudu* (insect) ... we say it is an animal … meaning it is a bad devil (*shetani mbaya*) or in other formal language it is a demon … when it attacks you, it either stays in all your body parts, legs and arms or in one part of your body.

Some respondents referred to the demons as *shetani* (devil, evil spirit) and *jini* (derived from Arabic word for demon '*jinn*').

Such demons intentionally attack a person, in association with witchcraft, or strike accidentally. For example, a 42-year-old female patient reported:

> The demon just comes … it just attacks you. It attacked me [at night] and when I woke up next morning my arm and leg were heavy … I felt numb … you can see my eye … this whole part became numb.

This causal explanation seems to be reinforced, or even imposed, by all groups of traditional healers who all associated cause of stroke with human agency through sending the demons to attack others. One healer said:

> You say stroke, paralysis illness … if you go with our expertise we traditional people will tell you that stroke is caused by a sent demon … that is the way we understand it.

In these cases, people should first seek treatment for removing the demon.

There is a common belief in Dar-es-Salaam that stroke attacks happen in toilets and on pathways. This was not substantiated in interviews with the ten patients in Dar. There was only one attack in the toilet – two while sleeping in bed at night, five while sitting at home, one in a commuter bus, and one during a meeting. For Hai, no such belief was reported and, of the ten stroke patients interviewed, three had attacks while sitting at home, one while washing dishes, one while taking a bath, one while coming back from the toilet, one in a bus on his way to work, one in a classroom while teaching, one while walking on the road, and one while farming.

Some respondents reported that the belief that most strokes happen in toilets resonates with local interpretations of Islamic teaching, which incorporates aspects of traditional magico-religious beliefs with demons assigned specific locations. People are taught to utter a special prayer when entering and leaving toilets in order to avoid being attacked by such demons.

In cases of stroke attacks inside or nearby toilets, it was said that sufferers should be smeared with faeces and urine. One woman reported that, when she had her stroke, she urinated on her clothes and her neighbour made her drink urine and smeared her with faeces: since demons that cause stroke don't like dirt, they would release someone smeared by faeces from the toilet.

(b) *Witchcraft.* Many Dar-es-Salaam respondents thought that stroke was caused by witchcraft (*kulogwa*). Witchcraft allegations involving stroke were mainly associated with conflict and jealousy within the community – conflict for land (between neighbours) or jealousy related to social advancement (e.g. taking children to school). An 80-year-old female stroke patient said:

> I do business and was getting some good money. I decided to demolish the mud houses and build cement block ones … I thought they would help my children when I die … they will get somewhere to stay … the decision let me down … Eeh ... they suddenly gave me stroke … I was just sitting and saw an animal coming to me … and it attacked me.

In rural Hai, the mention of witchcraft was uncommon. Only a few respondents, mostly traditional healers, believed stroke was caused by witchcraft; in villages at large few people were thought to believe this. This is probably partly due to the dominance of Christianity in the area, and a long historical missionary presence, with many schools and hospitals built by the Lutheran and Catholic churches. One 75-year-old male respondent illustrated this by saying:

> There are people who believe [that stroke is caused by witchcraft] ... but very few Christians ... It's just these days that it is coming up among Christians ... eeh these days it is coming up ... and it is caused by people who have interacted with other people. You know in the past those things were not here ... but interaction, people go out ... For example my father never knew about witchcraft ... or feeling jealousy for anybody.

In both Dar-es-Salaam and Hai, traditional healers perpetuate beliefs that stroke is caused by witchcraft and related demons, with appraisal of causes through divination and possession. All study respondents who reported visiting a traditional healer were told this. Even where traditional healers recognize a 'natural' affliction, the explanation offered is that witchcraft precipitated its actual manifestations (cf. Evans Pritchard's writings on witchcraft among the Azande, re-published 1976). For example, one traditional healer [using Koranic verses] agreed that his patient was suffering from stroke, but said this had been 'caused' by stepping over a charm placed across the road by jealous people who wanted to harm her.

(c) *'Pressure' (hypertension)*. In Hai, stroke was widely understood to be caused by high blood pressure (hypertension), a view which arose largely through interactions with health practitioners (doctors, nurses and village health workers) who told patients that stroke was caused by hypertension and should be controlled by medication and dietary salt reduction. In Dar-es-Salaam, by contrast, only a handful of respondents reported that high blood pressure causes stroke – a consequence of reduced contact with health professionals or to dominance of other belief systems.

(d) *Stress.* Many more respondents mentioned stress in Hai, compared with Dar-es-Salaam (24 vs 8). They said life had become difficult and people tended to think and worry a lot, about many things such as how they would feed their families or pay their children's school fees. A typical statement was made by a 72-year-old male stroke patient in Hai:

> For example, in my case, right from the beginning I was getting very upset very often. You are anxious about what your children will do, for example school children, fees … you only have two thousand and six hundred [shillings]. Like me, I have four children and they each need two thousand six hundred shillings. I only have two tins of beans. I was thinking and had no help I started being stressed … just stressed.

(e) *Fatty foods*. Another common belief in Hai – less common in Dar – is that stroke results from eating food cooked with a lot of oil or containing a lot of fat. In particular, usage of the cooking oil available in local shops, marketed to emulate modern lifestyles, was associated with increased incidence of stroke. A 75-year-old Dar man stated:

> This illness is caused by these reasons … either eating certain things … this cooking oil which has been brought to the shops is bad … it is not good … I do not take it … very bad … I have forbidden them [his family members] to buy it … I just buy coconuts [for cooking].

(f) *Other causes*. In both sites, stroke was also said to be the expression of 'God's will'. A few Hai respondents mentioned that stroke resulted from angry ancestral spirits. Only one Dar respondent reported that stroke could be inherited, though several respondents knew that other relatives had also suffered a stroke attack.

Treatment-seeking behaviours

Facilities within study sites and costs. There are 75 health facilities in Hai (of which 26 are public) and 113 health facilities in Temeke (of which 23 are public). Public

health facilities are preferred by the majority of residents as they are perceived to be cheap. The consultation fee at public health facilities is 1000 shillings (1US$ is equivalent to 1200 Tanzanian shillings). A national health insurance programme is operational in Tanzania whereby a family pays 10,000 shillings annually for consultation and drug costs. Few families are enrolled in this programme as they cannot afford to pay the money upfront in lump sum. In addition, respondents talked of erratic drug supply at public facilities resulting in them buying medicines instead from local shops. Health facilities in both sites are accessible throughout the year via a modest road network though respondents complained of high costs for hiring a vehicle to transport a patient to hospital. This may range between 2000 shillings in urban Dar up to 50,000 shillings in remote rural Hai. There is no huge cost difference between traditional healers and hospital services. Consulting a healer may cost between 2000 and 20,000 shillings depending on the type and duration of treatment. Traditional healers are generally perceived as cheaper since they usually allow payment in instalments or after treatment. Faith healers do not charge for the healing services though healed people may give a small amount of money as a thanks-giving offering.

Treatment patterns (see Fig. 1). In Dar-es-Salaam, the first resort for stroke is traditional medicine (six out of ten interviewed patients) administered by traditional healers. Medicines are taken orally, inhaled or massaged on the paralysed body parts, at the healer's or sufferer's home. Hospital treatment is the second most common treatment option (two out of ten interviewed patients). Combined traditional and 'modern' options are also evident. A 70-year-old male patient in Dar illustrated how traditional medicine is preferred in the first instance by saying:

> … [after the stroke] I was taken home … then they looked for an expert [healer] … he came and started applying his medicine until I regained consciousness … after I regained consciousness I was taken to my second house … and another healer was brought and he treated me … I started walking, sit up slowly … then Juma came [TSIP enumerator] looking for stroke patients … the first day he came in the morning … they came three of them … and told me we have come to take you to hospital … I refused, I totally refused, and they left … the second time they came and left … the third time they found me seated inside … and I told them come for me … I agreed as I had finished traditional matters … they said they will come on Monday … they came the next Monday and took me to hospital.

In Hai, the majority of stroke patients seek hospital treatment (seven out of ten interviewed patients): typically, this involves a nearby local clinic, but if the condition does not improve, a larger district or mission hospital.

Faith-based healing is another common option for stroke treatment in Hai and, to a lesser extent, in Dar-es-Salaam (two interviewed patients in Hai, none in Dar). Faith-based healing is mostly offered through Christian churches, though in Dar-es-Salaam, a Muslim faith healer did pray for stroke patients; people (with any illness) were taken to his home and prayed for, free of charge. The line between 'traditional' and 'faith-based' healing in Dar may be blurred, since Koranic verses are sometimes used to exorcise demons.

A stroke patient may be prayed for immediately after suffering a stroke, or after returning home from a hospital. The prayers are made by church members, during the illness episode or recovery, to seek a cure. Respondents stated, for example, that

prayers made the hospital drugs effective: as one Hai respondent said, 'God works through the pills by making them effective.'

In both sites, a combination of treatments was common, serially or simultaneously, inspired by a deep desire to get better by any means possible, and a need for hope in the efficacy of at least one of a range of options. Religious orientation *per se* did not appear to determine the treatment option sought. Some Christian respondents consulted traditional healers and offered sacrifices to ancestors as in the following example of a 44-year-old Hai stroke patient. She said:

> You know I then had a stroke ... my mouth went to one side and I went to the clinic ... at the clinic they told me that this is a strange illness therefore you must go to a bigger hospital ... I left and went to Kibosho [hospital]. I was treated at Kibosho until a [TSIP] doctor came and took me to KCMC. I stayed at KCMC and they took tests and they said that they did not see anything wrong in their tests ... I went back home and my condition became worse ... then I asked for money [from relatives] and went to buy a goat for offering sacrifice to ancestral spirits ... the goat was slaughtered and I continued getting relief ... then I went to a traditional healer at Kibosho who gave me medicine which I used ... then I got relief up to now.

There were mixed feeling from the patients who received treatment from traditional healers. Some expressed relief after treatment while others said they did not feel any better. For those who expressed relief, traditional medicine might have had a psychological effect of making them feel better. It may also be due to the natural course of the illness. A 59-year-old male patient in Dar reported:

> When I had it [stroke] I did not have the strength to sit up … I only used traditional medicine … one man [healer] was called to come and treat me using traditional medicine … he lives nearby … all my relatives came to help me … I was not conscious at that time … therefore he helped me using traditional medicine … I got relief from that situation … he gave me oral medicine until I regained consciousness … I was able to tell who is who.

Reasons for choice of treatment course

In Dar, the fear of injections at hospital appears to be a major factor deterring stroke patients from accessing the formal health system. It is commonly thought that a stroke patient may die following an injection, because demons feeding on blood gain entrance to the victim's body. There is not complete consensus on this issue among traditional healers in Dar (four of whom took this view, while one disagreed), yet patients commonly associated hospitals with injections and specified that hospital treatment should wait until a traditional healer had made demons leave.

Conversely, Hai people typically sought hospital treatment in line with their beliefs in 'natural' causation, pursuing other treatment options when outcome was not satisfactory. This decision is influenced by what patients and relatives hear from the doctors. Several patients who had been discharged from hospital following a range of tests (blood tests, chest X-ray and a CT scan) reported that doctors had told them there were 'no problems with their tests'. They interpreted this to mean that doctors could not see what was wrong with them, and as they continued feeling ill, they then pursued other available options for healing. A 44-year-old female respondent in Hai talked of such an experience:

> I went to KCMC [Kilimanjaro Christian Medical Centre], when I reached there I was admitted for that night ... the next day I was taken for X-ray ... I was taken for a head X-ray and chest

> X-ray ... They also took other tests such as [blood] pressure and the other test for the whole body ... then after giving out blood they told me that they do not see any problem with my tests.

Later in the interview she continued by saying:

> … at KCMC I was not given any drugs … when I came back I went back again to a traditional healer … Eee, because I said to myself if the doctor has taken tests and saw that there is nothing.

In some cases, where prayers over the long-term had brought no relief, patients resorted to switching church in search for a cure. A 48-year-old Hai respondent described how her husband moved from one church to another in search for a cure:

> First of all this person [her husband] had this paralysis illness … it is a recent illness as before that he had an illness of nose bleeding … he got cured from that illness … then he was losing consciousness … they say it is an illness of demons … he went to Lutheran church and was baptized … then he left and went to Pentecostal church … and he is still with Pentecostal up to now but they have not helped him, he is not cured, but he continues to pray to his God.

Treatment decision-making

Relatives are heavily involved in the process of decision-making, particularly for the first treatment option when a patient may be too incapacitated to take a decision independently. In their interviews, all but one stroke patient reported that spouses, brothers, sisters or children had been the ones deciding how and where their stroke episodes should be treated. The exception was a woman living in a rented house with other tenants, abandoned by her relatives after she became ill, divorced from her husband and without children; she and her neighbours decided she should go to hospital.

Discussion

In common with other stroke studies in SSA (Hundt *et al.*, 2004; Bham & Ross, 2005), causal explanations for stroke in Tanzania range from the 'natural' to the 'supernatural', with several respondents holding multiple causal beliefs simultaneously. Despite some overlap, there were substantial differences between respondents interviewed in Hai and Dar-es-Salaam. In rural predominantly Christian Hai, explanations were predominantly within the 'natural' model, with hypertension, diet and stress the leading causes cited. In urban predominantly Muslim Dar, stroke was more widely attributed to supernatural factors, such as demons and witchcraft.

A range of treatments were tried by stroke sufferers, with clear differences between sites. In Dar, traditional medicine was a first resort, and hospital treatment the second line; in Hai, hospital treatment was preferred on the whole. Avoidance of hospital in Dar was linked to the belief that injections can be fatal to someone who has just had a stroke (necessitating prior visit with a traditional healer who could 'remove' demons from the body). Such belief has been reported in South Africa (Hundt *et al.*, 2004; SASPI Team, 2004a) and elswhere in Tanzania in a coastal region close to Dar where mothers, believing that certain forms of childhood malaria (*degedege*) were caused by evil spirits, had refused injections for fear they would prove fatal (Comoro *et al.*, 2003).

The belief in demons causing illnesses is also reported among the costal Swahili of Kenya (Beckerleg, 1994). Local Islamic interpretations such as the residence of stroke-causing demons in toilets may be an example of how local Islamic interpretations are formulated to deal with new health technologies and challenges (Inhorn & Sargent 2006). It is unsurprising to find that non-medical explanations are readily elicited in the case of stroke. Unlike many other conditions affecting adults, stroke is an affliction that characteristically occurs very suddenly, in a person with no preceding illness or worrying signs, with very severe sequelae, usually paralysis of one side of the body. More than most conditions, there may be a sense that the victim has been 'struck' by some malevolent power.

It is notable that most stroke patients involved in this study employed several treatment options, either serially or simultaneously. This finding is common to other research on stroke-related beliefs and treatment-seeking behaviours in South Africa, for example, where plural healing systems involve traditional and Western medicine for treatment of stroke-like symptoms – visiting doctors, healers, prophets and churches – to deal with different aspects of their physical, mental and social well-being (cf. Hundt *et al.*, 2004; Bham & Ross, 2005).

It is interesting, however, that beliefs in supernatural causes were more common in urban Dar than in the rural district of Hai; this contrasts with other reports that witchcraft beliefs are more common in rural areas (Tanner, 1956; Mesaki, 1994). The comparison between sites, however, is far from straightforward since there are important cultural and historical differences between the two populations. In particular, the early influence of missionaries and the establishment of particular forms of Christianity among the Chagga have discouraged people in rural Hai from engaging with beliefs and practices associated with witchcraft.

From this study, it is clear that health beliefs play an important role in people's attempts to make sense of stroke and decide on the course of treatment. Even though the TSIP paid for transport, tests and treatment costs to a major referral hospital about 10 km away (Muhimbili), many people in Dar-es-Salaam preferred to seek traditional treatment, at least in the first instance. Clearly, health beliefs are not the only factor when people make sense of an illness or when deciding on treatment options, but this study demonstrates that these are very important, outweighing cost/distance factors in many cases.

Interactions with significant others, particularly healers (both health service staff and traditional healers), play an important role in treatment seeking. For example, the second treatment option taken by patients in Hai is influenced by their encounters with medical practitioners. What doctors communicate to patients, and how patients interpret what they say, alters the patient's explanatory models for stroke. In turn, this influences what treatment option is taken next, especially when doctors appear dismissive of symptoms as 'normal'. In particular, patients who are told that doctors find 'no problems' with results of hospital tests may interpret this to mean that doctors cannot see what is afflicting them; patients then opt for other treatment options, such as visiting traditional healers.

The extended family and close friends are also important in influencing the type of treatment a stroke patient receives. The first treatment option, in particular, is largely determined by relatives, due to the incapacity of the patient, while subsequent

decisions may be taken with more personal involvement. It is because stroke can lead to sudden incapacity that families are likely to be involved in treatment decisions – with other adult illnesses in rural Tanzania, it has been noted that while extended families influence decisions related to healing and access to health services, individual adults still made their own decisions regarding treatment option (Green, 2000). In the case of stroke, the substantial involvement of relatives in decision-making leads to interesting negotiations between explanatory models of different family members.

Policy implications

Although based on a limited sample, the rich narratives provided by the participants in this study illustrate clearly some of the challenges inherent in stroke management in these parts of Tanzania, where different belief systems and forms of practice confront one another. These findings highlight three important policy issues.

First, as other studies have demonstrated, (e.g. Hundt *et al.*, 2004; Bham & Ross, 2005) it is important to engage with, rather than dismiss, local explanations and interpretations related to stroke. The experience of the larger-scale TSIP, combined with the qualitative findings presented here, shows that beliefs of stroke causation are central to the ways in which people respond to the condition and seek treatment. Indeed, removing cost and distance barriers did not result in people abandoning traditional explanations and treatment options. Explanations featuring the supernatural make sense in cases where illness appears suddenly, has no obvious cause, and does not readily respond to biomedical treatment. Stroke awareness programmes need to take into account religious, historical and socio-cultural differences when designing appropriate health education messages. Developing a detailed understanding of local beliefs, within a model that recognizes that beliefs are not uniform and rigid but constructed through dynamic social interactions, will be critical to designing effective and 'culturally-compelling' interventions (Willms *et al.*, 2001; Panter-Brick *et al.*, 2006).

Second, there is a clear role for multiple healing systems to be involved in the treatment of stroke. This may be achieved through establishment of cross-referral systems between traditional and faith healers on one side and 'modern' health care services on the other side. Treatment within biomedical systems focuses largely on rehabilitation, management of disability (e.g. physiotherapy) and prevention of further attacks (e.g. treating hypertension). For many patients, loss of function is permanent. In this context, traditional and faith healers can play critical roles. They may help someone come to terms with what has happened to them, and make sense of their situation. Some respondents wanted to believe that recovery was possible, and used faith healing after exhausting biomedical options in order to face the future with hope, rather than dread.

Third, communication between health professionals, patients and relatives is critical. Two messages in particular are poorly communicated. Many people may abandon biomedical treatment because they do not see themselves being 'cured': it is essential to explain, from the outset, the limitations of treatment versus rehabilitation and prevention. Test results are also miscommunicated: where verdicts are phrased as

'normal' or 'no problem with the tests', patients may think doctors dismiss their condition as trivial or non-existent; because this conflicts with their experience of serious functional losses, they feel demoralized and abandon hospital treatment.

Acknowledgments

The authors thank all study participants in Dar-es-Salaam and Hai for their valuable time and information. Many thanks also go to Neema Busali, who assisted with carrying out the interviews, and the TSIP team, especially Dr Ferdinand Mugusi, Dr Eric Aris, Dr Ahmed Jusabani, Mary Lewanga, Gregory Kabadi, Victor Mponzi, Ali Mhina and Mzee Sultani, for their support while carrying out the fieldwork. The authors would also like to thank John Changalucha of NIMR for giving permission to the first author to carry out the study. This study was funded by the Wellcome Trust.

References

Baer, R. D., Weller, S. C., Garcia, J. G. A. & Rocha, A. L. S. (2004) A comparison of community and physician explanatory models of AIDS in Mexico and the United States. *Medical Anthropology Quarterly* **18**(1), 3–22.

Beckerleg, S. (1994) Medical pluralism and Islam in Swahili communities in Kenya. *Medical Anthropology Quarterly* (New Series) **8**(3), 299–313.

Bernard, H. R. (1995) *Research Methods in Anthropology*. Walnut Creek, London.

Bham, Z. & Ross, E. (2005) Traditional and Western medicine: cultural beliefs and practices of South African Indian Muslims with regard to stroke. *Ethnicity and Disease* **15**, 548–554.

Castle, S. E. (1994) The (Re) negotiation of illness diagnoses and responsibility for child death in rural Mali. *Medical Anthropology Quarterly* (New Series) **8**(3), 314–335.

Comoro, C., Nsimba, S. E. D., Warsame, M. & Tomson, G. (2003) Local understanding, perceptions and reported practices of mothers/guardians and health workers on childhood malaria in a Tanzanian district-implications for malaria control. *Acta Tropica* **87**, 305–313.

Connor, M. D., Walker, R., Modi, G. & Warlow, C. P. (2007) Burden of stroke in black populations in sub-Saharan Africa. *Lancet Neurology* **6**, 269–278.

Dein, S. (2004) Explanatory models of and attitudes towards cancer in different cultures. *Lancet Oncology* **5**, 119–124.

Drever, E. (1995) *Using Semi-Structured Interviews in Small-Scale Research: A Teacher's Guide*. Scottish Council for Research in Education, Glasgow.

Evans-Pritchard, E. E. (1976) *Witchcraft, Oracles, and Magic among the Azande*. Oxford University Press, Oxford.

Glasser, B. G. & Strauss, A. L. (1967) *The Discovery of Grounded Theory: Strategies for Qualitative Research*. Aldine, New York.

Green, E. C. (1999) *Indigenous Theories of Contagious Disease*. AltaMira Press, California.

Green, M. (2000) Public reform and the privatisation of poverty: some institutional determinants of health seeking behaviour in Southern Tanzania. *Culture, Medicine and Psychiatry* **24**, 403–430.

Hundt, G. L., Stuttaford, M. & Ngoma, B. (The SASPI team) (2004) The social diagnostics of stroke-like symptoms: healers, doctors and prophets in Agincourt, Limpopo province, South Africa. *Journal of Biosocial Science* **36**, 433–443.

Indepth Network (2002) *Population and Health in Developing Countries* (Vol 1). IDRC, Ottawa.

Ingstad, B. (1990) The cultural construction of AIDS and its consequences for prevention in Botswana. *Medical Anthropology Quarterly* (new series) **4**(1), 28–40.

Inhorn, M. C. & Sargent, C. F. (2006) Introduction to medical anthropology in the Muslim World. *Medical Anthropology Quarterly* **20**(1), 1–11.

Kamat, V. R. (2006) 'I thought it was only ordinary fever!' cultural knowledge and the micropolitics of therapy seeking for childhood febrile illness in Tanzania. *Social Science and Medicine* **62**, 2945–2959.

Kleinman, A. (1980) *Patients and Healers in the Context of Culture*. University of California Press, Berkeley.

Kusimba, J., Voeten, H. A. C. M., O'Hara, H. B., Otindo, J. M., Habbema, J. D. F., Ndinya-Achola, J. O. & Bwayo, J. J. (2003) Traditional healers and the management of sexually transmitted diseases in Nairobi, Kenya. *International Journal of STD and AIDS* **14**, 197–201.

Mabilia, M. (2000) The cultural context of childhood diarrhoea among Gogo infants. *Anthropology and Medicine* **7**(2), 191–208.

Mesaki, S. (1994) Witch-killing in Sukumaland. In Abrahams, R. (Ed) *Witchcraft in Contemporary Tanzania*. African Studies Centre, University of Cambridge, Cambridge, pp. 47–60.

Miles, M. B. & Huberman, A. M. (1994) *Qualitative Data Analysis*. Sage, Newbury Park, CA.

Mshana, G., Plummer, M., Wight, D., Wamoyi, J., Salamba, Z. & Ross, D. (2006) 'She was bewitched and caught an illness similar to AIDS': AIDS and sexually transmitted infection causation beliefs in rural Mwanza, Tanzania. *Culture, Health and Sexuality* **8**(1), 45–58.

Murrary, C. J. L. & Lopez, A. D. (1997) Mortality by cause for eight regions of the world: Global Burden of Disease Study. *Lancet* **349**, 1269–1276.

Narayan, D. (1997) *Voices of the Poor. Poverty and Social Capital in Tanzania*. World Bank, Washington, DC.

Nyamwaya, D. (1981) Complementary in Health Care: The case of Elgeyo-Marakwet District. In Kipkorir, B. E., Soper, R. C. & Ssenyonga, J. W. (eds) *Kerio Valley: Past, Present and Future*. University of Nairobi, Nairobi, pp. 120–131.

Panter-Brick, C., Clarke, S. E., Lomas, H., Pinder, M. & Lindsay, S. W. (2006) Culturally-compelling strategies for behaviour change: A social ecology model and case study in malaria prevention. *Social Science and Medicine* **62**, 2810–2825.

Poss, J. & Jezewski, M. A. (2002) The role and meaning of *Susto* in Mexican American's explanatory model of Type 2 Diabetes. *Medical Anthropology Quarterly* **16**(3), 360–377.

Reedy, K. S. (2004) Cardiovascular disease in Non-western countries. *New England Journal of Medicine* **350**(24), 2438–2440.

SASPI Project Team (2004a) Secondary prevention of stroke-results from the Southern Africa Stroke Prevention Initiative (SASPI) study. *Bulletin of the World Health Organisation* **82**, 503–508.

SASPI Project Team (2004b) Prevalence of stroke survivors in rural South Africa: Results from the Southern Africa Stroke Prevention Initiative (SASPI) Agincourt Field Site. *Stroke* **35**, 627–632.

Sindiga, I. (1995) Managing illness among the Luo. In Sindiga, I., Nyaigotti-Chacha, C. & Kanunah, M. P. (eds.) *Traditional Medicine in Africa*. East Africa Educational Publishers, Nairobi, pp. 64–79.

Tanner, R. E. S. (1956) The sorcerer in northern Sukumaland, Tanganyika. *Southwestern Journal of Anthropology* **12,** 437–443.

Tibandebage, P. & Mackintosh, M. (2005) The market shaping of charges, trust and abuse: Health care transactions in Tanzania. *Social Science and Medicine* **61**(7), 1385–1395.

Walker, R. W., McLarty, D. G., Kitange, H. M., Whiting, D., Masuki, G., Mtasiwa, D. M., Machibya, H., Unwin, N. & Alberti, K. G. M. M. (2000) Stroke mortality in urban and rural Tanzania. *Lancet* **355**, 1684–1687.

Willms, D. G., Johnson, N. A., Chingono, A. & Wellington, W. (2001) AIDS prevention in the Matare and the community: a training strategy for traditional healers in Zimbabwe. In Higginbotham, N., Briseño-Leon, R. & Johnson, N. (eds) *Applying Health Social Science*. Zed Books, New York, pp. 163–182.

WHO (2002) *Reducing Risks Promoting Healthy Life*. The World Health Report. World Health Organization, Geneva.